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ABSTRACT

Communication technology (CT), which involves the use of computers in private and group communication, has had a major impact on theory and research in organizational communication over the past 30 years. From the 1950s to the early 1970s, mainframe computers were seen as managerial tools in creating more centralized organizational structures. During the late 1970s, the decentralizing effect of computers on organizational communication and the impact of the new technologies on society gained more attention. Recently, the increasing centralization of the information society has been stressed once again. Real effects of increasing organizational centralization may include a power shift away from middle management and toward the power elite. How organizational members segment internal or public audiences is now increasingly based on infographic rather than demographic or psychographic variables. The concept of infographic segmentation can be extended, perhaps, to the global characterization of an organization or its subunit as showing either symbolic, ritualized, or interactive communication styles. Furthermore, to the extent that groups or individuals share a particular form of infographic culture, they indicate infographic cohorts. Consideration of theoretical questions not only makes sense of the rapid changes in communication technology, but also helps to guide them. (MM)

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ORGANIZATIONAL COMMUNICATION:

Theoretical Implications of Communication Technology Applications

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INTRODUCTION

In contemporary news coverage of the information revolution, organizations are pitched as the creators of communication technology (CT) and consumers are pitched as the users of and the recipients of CT products, services, and benefits. The story about organizations' own uses of CT and the resulting effects is essentially untold. In contrast, writers in the trade and academic media often give the lead story to organizations as users and "effectees" of CT. Despite the information elite's attention in the trade and academic media to this general area, our knowledge of particular organizational CT effects is yet to appear in sharp focus. The objectives of this paper are to highlight some theoretically oriented CT effects on organizational communication and to ground this treatment in the 30 year history of research on the impacts of computers on organizations. Given the limitations of a paper such as this, it is more of an extended outline than a fully explicated treatise.

Definitions and Assumptions

Before discussing substantive issues, some definitional context and subtext is in order. First of all, what is '<u>communication technology</u> (CT)'? In popular terms, "high tech" or CT is typically associated with computers. Yet some observers have taken different views. At the other extreme, some define technology as a product of the broader and dominant social construction of "technique" that may or may not involve particular communication media (Ellul, 1964; 1980). Such a radical social definition has some value. It points to the relations among human participants as a primary feature of technology.

This human aspect is sometimes lost by the engineering-oriented. They may see a communication network as hardware-software nodes in the foreground, linked together through some sort of telecommunications media; people are in the background enabling the hardware-software nodes to "talk" to each other.

In vivid contrast, the human communication researcher is likely to conceive of a communication network with people foregrounded as nodes linked together in message exchange through a variety of communication technologies, including face-to-face interaction. Thus, the radical social definition of technology is not a necessary sensitizing agent for most human CT researchers.

Moreover, the radical definitions are theoretically limiting in that they downplay distinctions between kinds of technologies. Eventually this may be theoretically useful. But at present it does not fit popular forces. People do talk about CT in terms of particular hardware/software/peopleware configurations. If one value of social theory is providing some certainty and stability during periods of rapid change, such theory should be couched to some extent in the language system of the phenomenal processes. This argues for the contemporary utility of theorizing about CT as distinguishable from other technologies such as radio, television, printing, etc.

For purposes of this paper, organizational CT will refer to the following communication media:

- o computer messaging (private mail),
- o computer conferencing (group communication),
- o computer bulletin-board (CBBS),
- o computer newsletter (periodic online distribution to a large group),
- o database (commercially offered or constructed "in-house"),
- o voice-mail (audio store and foward),
- o audioconferencing,
- o videoconferencing.

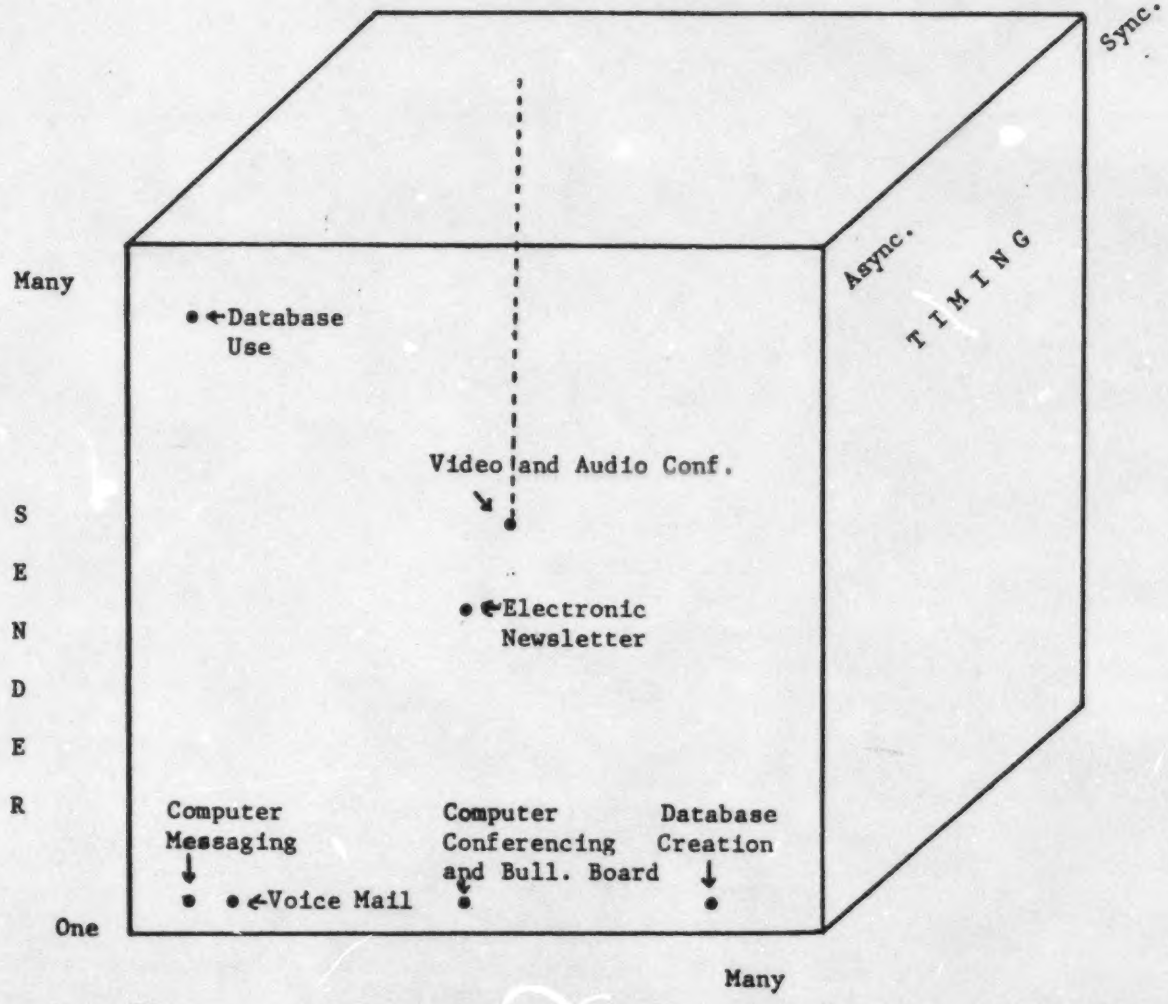
These CT's range from mainly <u>one-to-one</u> participant applications, such as private computer messaging, to essentially <u>many-to-one</u>, in the case of large

scale database systems that an individual searches. The media also vary in degree of synchrony, the extent to which participants exchange information at the same time. The audio and videoconferencing media are synchronous, while the computer-based media ranging from messaging to voice-mail are asynchronous, and to varying degrees depending on the particular usage patterns. Figure 1 displays these CT media in relation to one another.

The trends in organizational CT are toward integrated systems combining voice or other audio, text, graphics, and numerical processing. Even though such systems can be looked at as a single medium (to the extent multiple functions are integrated), it may still be useful to treat relatively discrete communication functions as separate media. In such cases, the media may be defined according to an interaction between the kind of sensory modes engaged in the participants, their level of social aggregation, and the specific hardware-software architectures. At present, the definition of alternative organizational CTs is not too troublesome, at least for practical purposes. But, as CT systems become more integrated and new features are added, it may be increasingly difficult to define distinct CT media within them. This may present interesting theoretical problems, yet to largely unfold.

Now that CT is defined, what about 'organization'? Most organizational researchers apparently need no definition of the term. This is evidenced in its consensual use and no extensive questioning of its meaning. There is, however, one possible CT effect that is subtly reshaping implicit definitions of 'organization.' This is the loosening of physical proximity as a nearly necessary condition for a person's primary association with an organization. Increasing numbers of individuals work from the home or other remote "electronic cottage" area, rather than in the organization's primary office

FIGURE 1. Communication Technology Space



locations. This may suggest rethinking earlier research showing physical propinquity as the primary predictor of organizational communication network activity (Monge and Lindsey, 1974). In fact, Korzenny (1978) suggested "electronic propinquity" as a substitute for physical propinquity when CT are used.

Nevertheless, despite the popular attention to telecommunication-transportation tradeoffs (Nilles, et al. 1978), there is little hard evidence that space, or physical proximity, is significantly more transcended in a CT environment than in a traditional one. In fact, substitutions of CT for other communication modes are most likely with conventional mail and telephone use. (Danowski, 1982; Picot, et al., 1982). Mail and telephones are traditional vehicles for communication beyond physical boundaries. As these are already space transcendent media, it seems that CT may not add much to organizational space transcendence.

Time transcendence is another organizational CT aspect that observers have highlighted. For computer-mediated communication such as electronic mail, messaging, conferencing, and voice-mail, it is possible to have more asynchronous communication. At the same time, however, other CT such as audio and video conferencing foster the reverse, that is synchronous communication. So in balance, perhaps time orientation is unaffected, to the extent that organizations use a multipilicity of available technology. Empirical research to investigate this is, however, in order.

There is another time aspect that bears mention. This is organizational time horizon. Do CT foster a change in how far into the future organizations plan? Some observers comment on CT's improvement of strategic planning. Database oriented CT allow more rapid gathering of diverse environmental

information and time-series projections of key trends. Presumably, as organizations take advantage of these capabilities, they lengthen their time horizons, planning further into the future. Nevertheless, other forces may be more causally potent than CT in determining the organization's planning orientation. Yet, possible CT effects on organizational time-horizon are perhaps worthy of more investigation.

Alternative Units

One of the most important intitial decisions an analyst can make is choice of the units of analysis. Where one looks for effects determines to a great extent what one finds. And, looking in some locations may be more fruitful than in others. Much communication research seems to resonate with the old metaphor of the person who lost a key on a street some blocks away from were she was looking because there happened to be a light at that location. Given the "light" of traditional research, most initial CT research started with the individual users and examined their subjective orientations to attributes of communication modalities, "social presense" for example (Short, Williams, and Christie, 1976). In these cases individuals' perceived channel attributes are the units of analysis.

More recently, attention has shifted to higher units. One is message content exchanged. For example, Steinfield (1980) examined job performance monitoring messages with respect to CT and other modalities. Alternatively, some researchers have examined CT effects on other organizational media use (Danowski, 1982; Picot, et. al., 1982). This illustrates channels as the level of analysis. Moving some rungs further up the ladder of abstraction is the group as the CT related unit (Rice, 1982). More absract units include the broader network of CT groups, that is the patterns of inter-group linkage (Danowski, 1983). Other more macro units of analysis are also possible.

In short, units of analysis can be defined with attention to the CT channels, content, and participants. Within each area, a mix of multiple levels of analysis is possible. Channels can be directly compared. Or, they can be examined in terms of underlying attributes. Message content can be analyzed at alternative levels of analysis, such as the semantic, syntactic, thematic, genre, etc. Also, participants can be examined along the familiar individual, dyad, group, network, etc. continuum. Moreover, various combinations within and across channels, content, and participant levels are possible.

The full range of combinations of units occur in most organizational settings. As such, just about any levels approach fits some reality of organized life. Nevertheless, pursuing some levels may be more fruitful than others, if the concern is parsimonious theorizing. One way to determine this is to answer the question: What is relatively unique about organizational communication compared to other forms? One answer is coordinated task-oriented communication activity across groups of individuals, in other words, the organizational network (intergroup) level, or higher. Attention to these macro levels of analysis may be particularly fruitful. Certainly other levels of CT effects may occur, but they are probably identifiable and explainable without reference to unique organizational variables. Accordingly, in this paper a macro focus will dominate, although other aspects will be secondarily treated.

Mass and Organizational Communication

The traditional distinctions between mass and organizational communication were rather clear. About the only link between the two was in the area of public relations. Although this link has been practically rich, there has not been much theoretical work on public relations activity as a bridge bet-

ween mass and organizational communication processes. So, mass and organizational communication theory have been nearly mutually exclusive in scope. Nevertheless, study of internal and external public relations today can provide a window for examining the integration of contemporary organizational, mass, and CT communication. Unfortunately, given this paper's mandate, issues associated with the synthesis of these three theoretical areas, although numerous and interesting, cannot be extensively discussed. Only indirect references will be made to this area as specific organization-CT issues and questions are considered.

Exclusions

There are several organizational communication areas that are not treated in this paper. These have practical value, but probably not much unique CT theoretical significance. Most prominant of these is "diffusion of innovations" and "user resistance to change." Organizational implementors of CT find the latter a major barrier (Tellefson, 1983). But, there does not seem to be much unique about the process with respect to CT. Some people appear to resist CT like they resist other innovations and do so for similar reasons. But empirical evidence for this assertion is in order.

Another area not of explicit concern here is productivity. CT is being marketed as a way to increase "knowledge worker" productivity. But the definition and measurement of such 'productivity' is tenuous. Some attempts have unitized knowledge produced, but few have been able to resolve thorny problems as to its effectiveness or utility. Given the underdevelopment of this area, the productivity-CT linkage appears ripe for theoretical and empirical development.

Organizational conflict is also not extensively considered here. It could be, however, in two basic ways. One way is with CT as a stimulator of

conflict. CT may provide a visible vehicle for conflict between the "old guard", resistant to change, and the "new wave." But, in the broader scheme of things, these conflicts seem to have similarly occured in earlier eras around other ideas and objects. So, there may be nothing theoretically unique about this conflict with respect to CT. On the other hand, some organizational members, particularly middle-managers, are perceiving losses in their job security or advancement as a result of productivity gains associated with CT. This may present a somewhat different problem.

The other conflict-CT relationship is using CT for conflict resolution, whatever the conflict source. It has been suggested, however, that CT are not very useful for emotional and complex content with sensitive subtlety (Picot, et. al., 1982). And to date there doesn't appear to be much continuing application of CT for conflict resolution purposes.

Communication satisfaction and job satisfaction are also not of direct concern here. This is mainly because of the macro focus and not because there may be a lack of linkage to CT. To the contrary, many workers anectdotally seem to have more fun using CT than working in more traditional ways. Now, this may be a transitory effect associated with the "toy stage" of CT. But, the interactiveness of many CT systems may increase job and communication satisfaction (except for people CT displaces). The television commercial of the secretary enjoyably shaking a hand emerging from her CRT screen seems to summarize CT satisfaction well.

Other information climate variables are also not of direct concern in this paper, at least as they have traditionally been treated. But in another way, such variables are considered in a more macro and anthropological manner, through discussion near the end of the paper of infographic cohorts and

cultures within and across organizations. Supervisor/subordinate relationships are also not given primary attention. They are treated, however, as part of power and structural relationships.

THEORETICAL MACRO LEVEL ORGANIZATIONAL CT EFFECTS

The remainder of this paper focuses on several potential organizational CT effects that are not probably better treatable in an alternative theoretical area, such as interpersonal communication, mass communication, etc. As stated earlier, the levels that appear particularly germaine to organizational theorizing are the intergroup network levels and more macro ones. The discussion to follow will emphasize these, but will also address other levels as relevant. First to be considered are issues about potential overall centralization-decentralization effects associated with CT uses in organizations.

Complexity vs. Centralization-Decentralization

Although the terms 'centralization' and 'decentralization' are most often used without apparent ambiguity, there are times when what appears to some observers as decentralization appears to others as centralization. Similar problems arise with the term 'complexity'. Let us distinguish first between the concepts of 'complexity' and 'centralization-decentralization'. Complexity is a product of both an observer's knowledge and the observed organization, whereas centralization is a more objective structural concept that is less depedendent on the particular observer, and more dependent on consensual intersubjectivity.

In particular, consider how complexity is a function of both observer and observed. For example, imagine older persons who wish to obtain social services from a government organization. Consider two particular older people,

one who is highly knowledgable about the structure of the organization and another that has very little such knowledge. Now, consider an organizational structure that is highly centralized, which we will define simply for the moment as having high task differentiation; each unit of the organization has responsibilitly for a specific task (akin to classic bureaucratic organization).

To the less knowledgable older person, such a centralized organizational structure will appear very complex. The person first goes to one office for a particular purpose, then is sent to another office, then another, perhaps the wrong office, etc. At each station a relatively subtle and narrow aspect of the older person's problem may be treated. All in all, as this organizational centralization interacts with low observer knowledge, the likely result is the observer believing the organization to be highly complex.

On the other hand, consider the reverse situation with respect to observer knowledge. Imagine a highly knowledgable older person who interacts with the same centralized organization. To this person the centralized organization is likely to appear less complex. The person knows where to go to obtain particular information and can efficiently do so. She knows the simplified task structure of the organization.

Next, consider the same two older observers, but now imagine a highly decentralized organization with little division of tasks; different organizational units each may do the same things as other units and at the same time do a variety of different things.

Take the case of the low knowledge older person first. As this individual interacts with the decentralized structure, it appears to be quite simple; the older person can get most needs served by a single unit, and it matters

little which unit, for that matter. There is little need to traverse the organizational structure having one need filled in one unit, others in other units.

In contrast, the knowledgable older person is likely to find the decentalized organization quite complex. While a number of units are supposed to be able to handle the same tasks, there will be variation in their abilities to do so, particularly as they are overloaded with information. The knowledgeable older person may wish to hunt around the organization to find rather hidden, subtle pockets of expertise to solve particular problems.

So, in short, complexity and organizational structure, such as typically described by the relative centralization-decentralization of various organizational networks, are different constructs. Complexity is a more involved concept that requires consideration not only of the organizational structure but of the knowledge level an observer has about the organization. Depending on variations in each, there can be quite contradictory, paradoxical results in using the term 'complexity'. In this paper, therefore, we will adhere to the internal network aspects of these structural concept domains, and not to complexity notions.

Centralization Defined

By 'centralization' we will refer to an intraorganizational network that has the following properties, not necessarily all of them, but a large proportion. First of all with centralization there is a relatively high restriction in pathways of information flow. In the decentralized case, messages can flow among all or many of the units. In the extreme, there are $n(n-1)$ possible pathways or links for information flow (where 'n' is the number of nodes). In contrast, the centralized network has a much lower density of links, in other words, information can flow only along a small subset of

all those paths possible. Furthermore, different message content takes different paths and nodes specialize in processing content.

Along with low network density, the centralized network has a small proportion of nodes, typically 20% of all members, that dominate the information flow network. In other words, these 20% of the nodes are like hubs in a wheel, with other nodes radiating out along spokes. This is akin to the wheel network structures created in small group research some 30 years ago. Because of this dominance of network structure by a small proportion of organizational nodes, centralized networks are more than simply low in structural density; the high inequality in distribution of these low numbers of links is crucial.

Another feature of centralized networks is in the levels at which elemental nodes are defined. In the centralized network, individuals tend to be the primary nodes that organizational members think about when they consider the organizational structure. In contrast, in decentralized networks, there seems to be a higher probability that organizational members conceive of more macro units as the basic nodes, such as groups or departments, for example.

To the extent that groups do occur in the centralized organization, these tend to have a low degree of integration across groups. In other words, the network among the groups is low in connectivity or integration. There tends to be dominance of the intergroup network by a few other nodes. At the same time that there is this low intergroup linkage in the centralized organization, the intragroup connectivity is high (Danowski, 1976).

Additionally, in centralized networks key decisions tend to be made closer to the top of the organization than in decentralized networks. In the latter, the lower level members exercise more judgement as to what information to pass up and how to implement policies decided at its own level or at other levels.

In the centralized network, in contrast, lower level units tend to have less discretion in policy making and information decision-making.

Also, centralized organizations tend to have fewer hierarchical layers per size of the organization in numbers of people. The larger numbers of individuals tend to be positioned on fewer levels, each of which has less status differentiation among its occupants, but a rather high status differentiation across the hierachical layers (even though there are not a great number of them). Correspondingly, average span of control in centralized organizations tends to be higher, with more individuals reporting to a supervisor or manager than in the decentralized organization.

Computing Effects on Centralization-Decentralization

In the history of research on the organizational structure effects of computing, there have been three main stages (for alternative views, see Reimman and Inzerilli, 1981 and Kling, 1982). The first of these began in the 1950's and continued until the early 1970's, as represented in the work of a number of authors (Adams, 1966-67; Burlingame, 1961; Butler, 1969; Hill, 1966; Leavitt and Whisler, 1958; Lee, 1967; Meyer, 1968; Mitchell, 1966; Meyers, 1967; Parsons, 1968; Phillipson, 1962; Rhee, 1968; Sadler, 1969; Schultz and Whisler, 1960; Slater, 1958; Stewart, 1972; Susman, 1972; Whisler, 1970; Williams and Adams, 1968). The dominant theme in this research was the effects of mainframe computing on centralization of organizational structure. This period of research is best characterized by that of Whisler, culminating in his 1970 book, in which he clearly articulated hypotheses about computing's role in helping to centralize organizational structure, and in which he reports the results of a survey of large corporations. His findings included (Whisler, 1970; pps 11-12):

Organizational Structure:

- o A decline in the number of clerks and supervisors and a slight growth in the number of upper-level managers.
- o A decline in the number of levels in the organization.
- o A consolodation of departments.
- o A shift from parallel to functional departmentation.
- o Decline in lower-management levels; circumscription of middle-management roles.

Decision-Making:

- o An integration and consolodation of previously separate decision systems.
- o An shift upward in the location of decision-making in the organization.
- o The primary impact on decision-making at the middle- and lower-management levels in the short run and at the top-management level in the long run.
- o Increased inflexibility in decision-making.

Authority and Control:

- o An increase in centralization of control.
- o An increase in control by machine.
- o A tightening of control over individual behavior.

Job Content:

- o A tendency to rountinize and narrow job content at clerical and supervisory levels and to broaden it at upper-management levels.

Interpersonal Communication:

- o A decline in horizontal, clerk-to-clerk communication and an increase in horizontal supervisor-to-supervisor communication and manager-to-manager communication.
- o Mixed effects on upward and downward flow of information throughout the organization.

During this first research period on organizational structure and computing, most researchers took the point of view that the technology made it

more efficient for organizational designers and managers to create the kinds of centralized organizational structures that the had wished they could foster, prior to development of modern mainframe computers. Thus, computers themselves were not perceived to have some indirect or covert effect on organizational structure. Rather, the idea developed that organizational managers selected computer and communication technology that not only conformed to the status quo, but to the desired, but often unacheivable image or ideal of the status quo. Computers, per se, were perceived to be benign with respect to organizational structure.

The second period of computer-organizational structure research was primarily in the 1970's. Essentially, the period was dormant in terms of major new research and thinking about the effects of computer use on organizational structure and communication. It is as if researchers were anticipating some major changes to occur in the computer technology and application field and were adopting the ubiquitous "wait-and-see attitude".

Indeed, about the middle of the 1970's, the microcomputer was introduced, primarily, however, for home use. On the whole, the 1970's were the era of the minicomputer, rather than the microcomputer, when it came to business and other organizational computing. This intermediate computing technology may have created the awareness of changes underway in the structure of computing that perhaps were perceived to in turn lead to changes in organizational structure. Researchers laid in wait.

Late in the 1970's, the beginning of the third period of computer-organizational structure thinking some observers and advocates began to suggest a radically different organizational structure effect of computing. This change was associated with awareness of the microcomputer. Now the buzz

word was "decentralization", not centralization, as seen in a number of works (Blau, et al, 1976; Elgin and Bushnell, 1977; Mowshowitz, 1976; Overby, 1975; Wagner, 1976; Hiltz and Turoff, 1978; Haight, 1981; Shirbu, 1978). It was suggested by some of these authors that the microcomputer and/or computer-based communication represented a transformational vehicle for social change; the very structure of the micro and its functional capabilities would lead a virtual organizational revolution toward the "network society" (Hiltz and Turoff, 1978; Naesbit, 1982). This new view--different from that of the benign image of computers and of the proactive orientation of managers, a view dominant in the 1950's through early 1970's--attributed qualities of change to the technology itself, with human users in somewhat of a reactive, rather than proactive role, adapting to technologically lead change.

In terms of the literature, this is where we are now, in period three, the organizational "techno-decentralizer" era, as it were. Nevertheless, changes described in business trade media suggest the emergence of a new period in characterizing the effects of computers on organizational structure. This period has yet to become established in the academic literature, but seems likely.

In several ways, this new fourth period that is emerging is similar to the first period, that emphasizing the centralizing role of computing. The following discussion traces some of the new cloth woven of old threads and new spangles (microcomputers), as it were.

Few have recently argued for the increasing centralization of the "information society." Yet there is some evidence that the latter may be a realisitic, although perhaps not an exclusive effect. For example, in one organization in which we plotted the networks of computer mail traffic, we

observed virtually the most centralized network possible. Among about 100 users, there were about 3 main nodes. Each of these were at the center of a hub-spoke structure. They messaged with large numbers of users, pairs of whom did virtually no messaging with one another. Granted, this is one organization and anecdotal evidence, but we were surprised to find this, given the supposed structure of the "network society." This finding causes us to desire more careful empirical research on the question.

Another aspect of a possible increasing organizational centralization with CT is observable in a redefinition of practical power relations. Individuals who previously were primary information gatherers and providers may find their roles shaken and redefined, if not eliminated. For example, agricultural extension has traditionally used field agents to disseminate information to agri-business and community residents. With implementation of CT this role can be threatened. One way in which it may not be is if agents are defined as primary CT users. For example, Wisconsin Extension directs computer services mainly to agents, not their clientele. This maintains the agent's traditional information provider role and perhaps even enhances it to the extent that computer-based information is credible and suggests innovativeness.

At the same time, however, Extension is developing other information systems for direct delivery to clientele. A teletext agricultural information service to the home has begun operation this year. Such services by-pass or "short circuit" agents out of the information loop. At least this is a feeling some agents express.

Nevertheless, the power short-circuiting view may be short-sighted. In the longer run, as computer-based information services expand and proliferate, clientele may increasingly need "guides" and "scouts" to help them sort

through the information array. Such roles may be even more powerful than that of the traditional information provider. Consider the informal power of computer system consultants with whom you may deal.

Another indication of possible centralization effects and power shorting comes from an article in the Wall Street Journal (Bralove, 1983) about middle managers being threatened by top executives due to their CT use. It had been common wisdom that top executives do not publicly touch a computer device, for fear of status loss. This orientation seems to be eroding. The WSJ article claims that top executives are increasingly using microcomputers to access in-house and externally provided data bases, things that middle managers normally do. This is another indication of "by-passing" associated with CT, at the middle manager level, rather than at the field personnel level.

Other organizational power relationships also seem to be shifting for middle managers (Business Week, 1983b). Business observers suggest that increasing use of word and voice processing technology is reducing the ratio of secretarial/clerical staff to middle and lower level managers. The trends toward pooling of secreterial services, begun long ago with initial word processing systems, seem to be continuing. One possible structural implication of these patterns may be a more equal status distribution within horizontal levels, with a more extreme status differential across levels. Other CTs, databases and electronic monitoring and messaging, are also short-circuiting middle managers out of the traditional upward line flow of information from the lowest operations levels and reducing their numbers. These are possible indications of increasing organizational centralization.

Other relevant considerations are observable in the roles of public relations (or corporate communication, or public information, or public affairs)

practitioners in organizations. In most large organizations they are the primary gatherers and disseminators of non-operational information. Traditional public relations people have dealt primarily with media people from print and broadcasting. They have written and distributed press releases, held press conferences, and organized media events, but much of their interaction has been based primarily on face-to-face or telephone contact with journalists. Other practitioners have dealt primarily with internal employee publications, such as magazines, newsletters, payroll stuffers, and other employee media. Now, practitioners are seriously questioning their roles in the face of new technological applications.

Some public relations practitioners are apparently becoming more central in the intra-organizational network, moving closer to top level management decision-making. Recent research has shown that public relations practitioners who report higher in the organization and are more involved in decision-making, rather than serving only in a staff role, have higher usage of and preference for mediated communication, and a lower preference for face-to-face interaction (Cook, 1982).

More anectdotally, the public relations trade literature suggests that as practitioners gather more useful strategic intelligence and input it into organizational decision processes, their credibility, authority, and decision-making involvement increases. In particular, CT are discussed as a means for enhanced information gathering and decision input by public relations practitioners (Budd, 1982; Bleeker and Lenio, 1982; Finn, 1982; Forney, 1982; Hakensen, 1982; McGoon, 1982; Kruger, 1982; Burger, 1981; Ferguson, 1981, Jeffcoat, 1981; Lindenmann, 1981; Steiner, 1981; Graves, 1980; Mendell, 1980; Steinberg, 1980; Griswold, 1979; Katz, 1979; Lesly, 1979; Holtz, 1978; Kotler and Mindak, 1978; Rabin and Lehrer, 1978; Anon., 1977; Hill, 1976).

On the whole, their motivation for higher management involvement, coupled with the uses of CT to help accomplish this, is associated with the repositioning of communication specialists in a more central organizational role. In contrast, practitioners that are not redefining public relations roles with respect to CT appear (from a reading of the trade literature and to some extent the Cook (1982) study) to become more integrated with marketing and advertising units, hence operating in a more decentralized organizational structure.

In my own informal observations I have also noted the emergence of a more powerful information elite, within CT systems, particularly associated with use of personal computers. As we have examined various computer bulletin board and conferencing systems (albeit casually) we have noticed that a few users tend to dominate most interaction on each system. They logon a lot more than most others and serve as the sorts of hubs mentioned earlier. Again, these individuals appear to be associated with a more centralized information network than that in which they were previously located.

Organizational Infographics

Another possible macro organizational effect of CT is a shift in the manner in which organizational members segment external and internal publics or audiences for various communication activities. There seems to be a move toward infographic segmentation and away from demographics and psychographics. In a broad sense, infographics is similar to demographics and psychographics in that they all offer ways to divide an aggregate into subaggregates. Where infographics is different is that it directly uses communication and information processing variables to segment. Infographics therefore provides a more systems oriented segmentation. The subaggreates defined can be sub-

systems of a larger system rather than grosser collectivities as would occur if they were simply subaggregates defined via demographics and psychographics.

Note that traditionally demographic segmentation has been performed on aggregates external to the organization and has used the standard variables such as age, income, occupation, sex, etc. Nevertheless, demographic segmentation can be performed internally on organizations. Formal structural locator variables such as position in the hierarchy, tenure, departmental affiliation, etc. can be used.

When an analyst uses combinations of infographic variables, rather than one at a time, segmentation is performed according to infographic style. Infographic style is a generalized pattern of communication behavior that a system unit, such as an individual or higher order unit, maintains over time. It is a characteristic pattern of communication initiation and response. One of the organizational effects of CT appears to be a reshaping of organizational infographic styles.

One study found that CT users perceived changes in their communication behaviors such that the underlying dimensionality of organizational communication media use shifted. Communication media clustered more along functional lines. Whereas in pre-CT days media dimensions had no particular identifiable abstract meaning, in post-CT days media grouped according to formal bureaucratic, one-to-many, synchronous dyadic, and asynchronous dyadic dimensions (Danowski, 1982). Other investigators have also found organizational media use patterns to be associated with CT use (Bair, 1979).

On a broad scale, one theoretical implication of these findings is a focusing of attention on infographic style variables and the need to account for them propositionally and empirically. Note that in prior organizational com-

munication research, there was a tendency to treat communication in a series of discrete, disconnected ways. Styles or patterns of communication were not extensively examined. For example, information climate researchers focused on rather general attitudes toward the information environment, particularly individual perceptions of the quality of communication from supervisors and higher management. Little attention if any was given to the means of receiving or giving information. If such modes were considered at all, there was an explicit or implicit bias toward interpersonal communication, particularly among supervisor-subordinate dyads, and to a lesser extent toward small group communication. Other organizational researchers separately investigated readership of employee publications. In both areas of research, climate and readership, there was largely an atheoretic descriptive orientation.

Still other organizational communication research, primarily since the 1970's, focused on communication networks in organizations. This research also tended to ignore the channels through which dyads exchange information. Again, there was implicit focus on face-to-face communication. Often the global network of who-to-whom communication was mapped across all content, or sometimes across broad functional categories, such as production, maintainence, and innovation (Farace, Monge, Russell, 1978). Infrequently were channels the basis for segmenting networks.

In short, it seems the development of CT has lead to more refined communication awareness in organizations. They are more prone to use infographic segmentation techniques for both external and internal communication applications. In contrast, in the last couple of decades, it was more common to observe a global model of communication in organizations. This was the

"everthing is a communication problem" syndrome, one perhaps fostered by communication consultants of the era, but at the same time rather accepted by managers. Little differentation of kinds of communication problems was made. Again, most attention was on aspects of interpersonal communication, particularly supervisor-subordinate. In the CT era, the organizational models of communication appear to be more differentiated, not only with respect to channel, as one would expect, but also with respect to content and participants. In short, CT appear to be focusing attention on communication channel use in organizations, along with content and participant variables. Theoretical treatment of these may improve the overall fit of organizational communication theory to practical settings.

So in short, CT has a possible meta-communicative effect on organizations in its contribution to redefinition of organizational models about communication. To date, most investigators examine communication behaviors at the manifest level and have not attended to the underlying communication models which organizational managers and other members hold. These models may more efficiently predict the specific communication behaviors that occur, compared to working at the manifest levels only. This kind of investigation may call for a kind of ethnomethodological analysis of organizational communication. Hopefully this would occur in a sufficiently quantitative fashion to enable powerful hypothesis testing. This would avoid the often apt refrain that "ethnomethodology is ethNOmethodology."

Infographic Cultures

Additionally, one possibly useful theoretical extension of infographic segmentation is the definition of infographic cultures within and across organizations. Infographic culture is the global characterization of the organi-

zation or its subunits in terms of aggregate infographic style. Such cultures are the symbolic, ritual, and interaction systems with respect to communication. In particular, CT appears associated with a reshaping of individual infographic style and at the same time with a reshaping of aggregate infographic organizational cultures. One interesting theoretical question concerns the extent to which infographic culturalization of organizations is creating more or less common interorganizational cultures than in pre-CT days. Currently, the popular attention to computers does indeed seem to be fostering more common orientations of this sort across different types of organizations than has been the case. Empirical investigation of these possibilities may be worthwhile.

Infographic Cohorts

To the extent that groups of individuals who share a particular form of infographic culture maintain it over time, there is evidence for an infographic cohort. As there are different infographic cohorts, there is cohort differentiation and diversity. Infographic cohort analysis draws attention to the manner in which groups change or remain stable in infographic style. In pre-CT days, organizational infographic cohorts were seemingly defined more according to organizational status and tenure. There were strong social expectations as to how indiviuals should communicate as they occupied different strata of an organization. With CT, infographic cohorts seem more based on their adoption and uses of CT in relation to other organizational media than on organizational position or other organizational demographic variables. This again suggests changes in organizational models of communication.

Current shifts in infographic cohorts across organizations may be foreshadowed by those to come. At the same time that adults are reshaping info-

graphic styles, so are children and adolescents. In the not too distant past, organizational infographic cultures and childhood cultures were rather disconnected. Children learned some about how to communicate face-to-face with peers and superiors, and maybe learned a little about business letter writing in school. But, much of children's communication time was spent with television. While there is now increasing use of corporate video, there is relatively little compared to the position of television use in infographic culture outside the organization. With CT, in contrast, children are learning computer literacy skills that have a more direct linkage to skills observable in organizational infographic cultures with respect to CT. This indicates convergence in organizational and popular infographic styles and cohorts.

Nevertheless, it should not be assumed without evidence as many do, that the current junior high age cohort will be the "computer generation" of the future. Rather, evidence from political communication cohort analysis suggests that the cohort that is between ages 30 and 50 when a new technology becomes popular tends to use it at a higher rate throughout the remaining life-course than do other cohorts (Danowski and Ruchinskas, 1983). Thus, the post-World War II "Baby Boom" cohort, what had also been called the "TV Generation", may prove to be the "Computer Generation." The current junior computer users may be expected to adopt a future major communication innovation that becomes popular during their ages 30 to 50, in the early part of the next century. They in turn will become the "X generation", where X is the next new medium.

At the same time, infographic cohorts may be less age based. Again, political communication cohort analyses have shown that mass electronic media are more associated with age based cohort formation than are text oriented media,

such as newspapers and magazines (Danowski, 1981). Part of this effect may be due to the degree to which audience members are large collectivities that receive the same message at the same time. Such synchronous mass distribution of information reached a peak with the former dominance of network television. To the extent that such synchrony is lower and audience size is smaller, age-based cohort formation is lower. This suggests that CT, which are quite micro, (have less synchrony and audience size per message content unit than do other media), are less likely to be associated with age-based cohort formation. This may highlight the decline of age-based generational differentation in Western post-industrial democracies and the emergence of infographic generations as these societies transition to "information societies." While these sorts of effects are more macro than the organizational level, they have direct to relevance organizations as different infographic generations pass through them.

SUMMARY

This paper has explored several macro level theoretical implications of CT use for organizational communication. Areas considered have included questions about organizational centralization-decentralization; power redistribution; public relations activity; and infographic models, styles, cultures, and cohorts. When an area of study begins to undergo rapid acceleration in change, as is the case with organizational communication, it is difficult to move beyond the surface of surface level changes, and to consider more abstract theoretical questions. Yet, such thinking can not only help make sense of exploding change but help to guide it. This paper has attempted a small step in this direction.

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